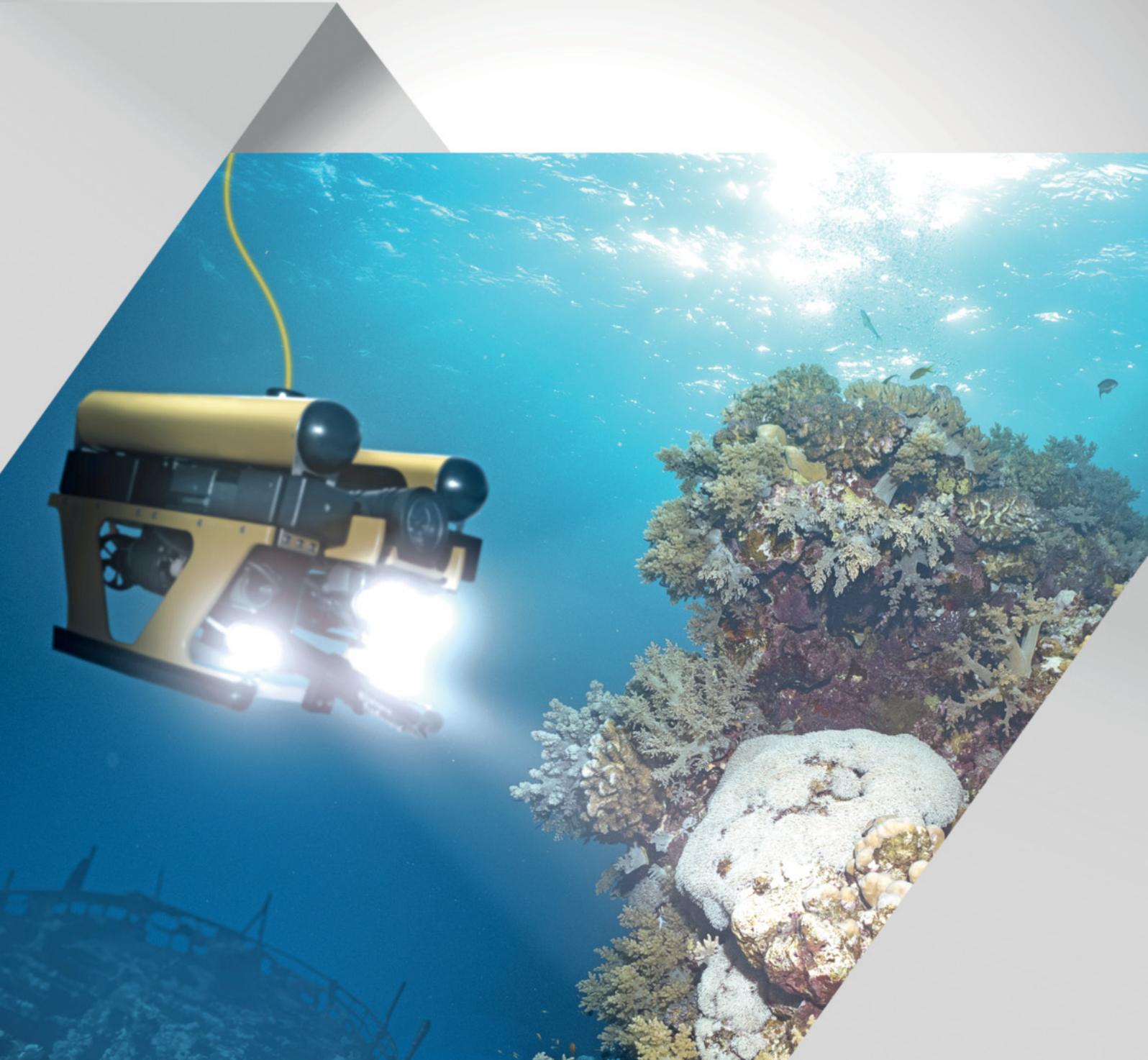


CABLES FOR MARINE TECHNOLOGY



www.sab-cable.com



Family business in the third generation

75 years of experience in cable and wire manufacturing as well as in temperature measurement technology turned a one-man business into a company with more than 550 employees. We prove our strength every year with more than 1500 special products according to customers' requirements. Each product is a new challenge for our creative technical team. We at **SAB** see ourselves as a manufacturer and a service provider – in the sense of true partnership and the greatest possible customer orientation.

Today, the quality of our products is known and appreciated in more than 100 countries around the world. In all product ranges, we are certified according to DIN EN ISO 9001. Furthermore, we have implemented an environmental management system for our company according to DIN EN ISO 14001, an occupational health and safety management system according to NLF/ILO-OSH and DIN ISO 45001, and an energy management system according to DIN EN ISO 50001.

And also for the future, our slogan is: **"WE GO FORWARD!"**

FOUNDED:	1947 by Peter Bröckskes sen. an independent, medium-sized company.
CEO:	Peter Bröckskes and Sabine Bröckskes-Wetten
PLANT/LOCATION:	In Viersen (Lower Rhine) 110.000 m ² company site. Own manufacturing from copper conductor to outer sheath. VDE approved burnchamber and laboratory within the company.
EMPLOYEES/WORKERS:	approx. 430 at the plant in Viersen, 550 worldwide
YEARLY SALES:	over 134 Mio. € worldwide
PRODUCTS:	Special Cables Measurement Technology Cable Harnessing
CERTIFICATES AND APPROVALS:	Quality management system acc. to DIN EN ISO 9001 for every manufacturing field Environmental management system acc. to DIN EN ISO 14001 Occupational health and safety management acc. to NLF/ILO-OSH and DIN ISO 45001 Energy management system acc. to DIN EN ISO 50001



Cables for marine technology

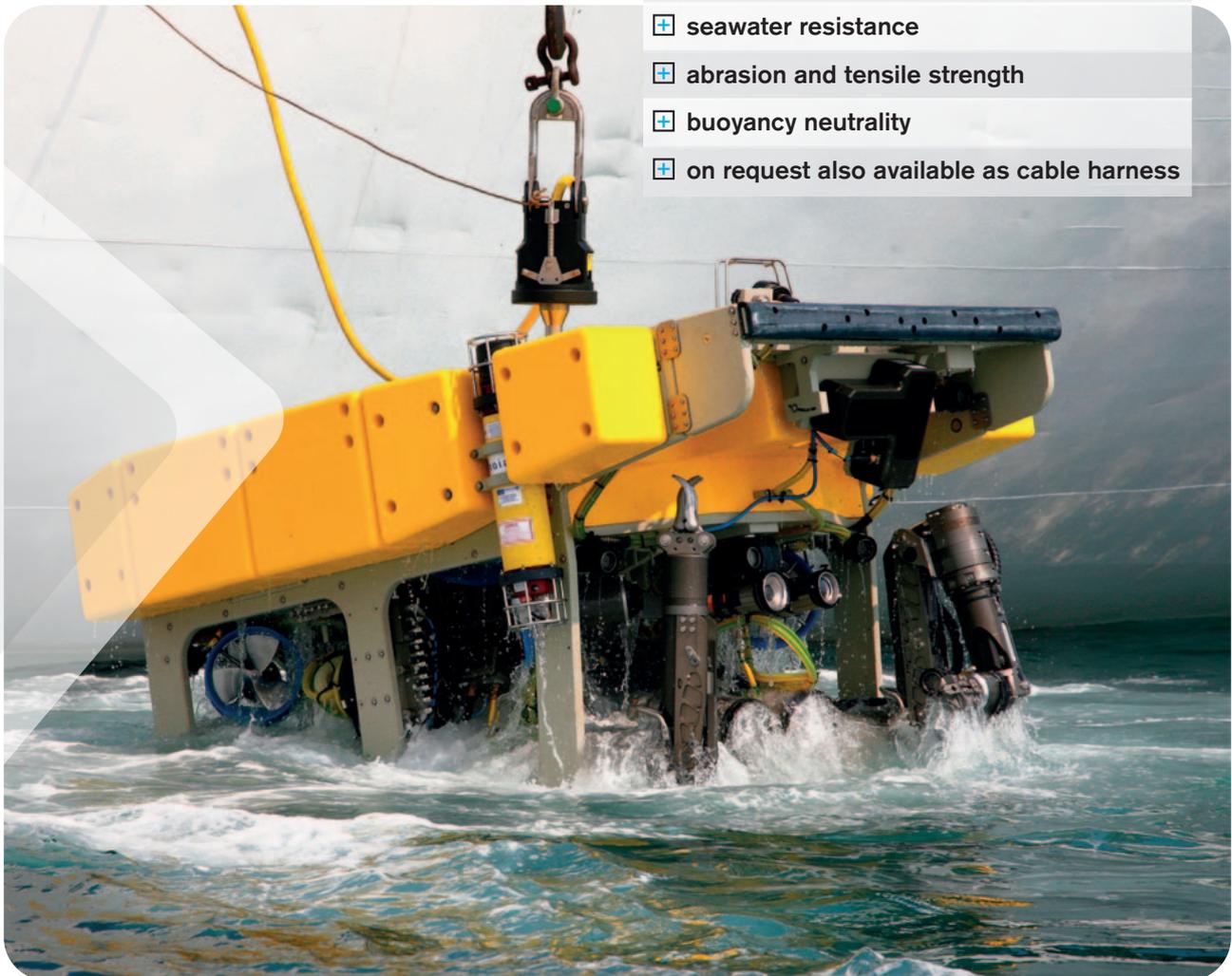
Development and production

SAB BRÖCKSKES – your marine specialist for marine systems

In total 71 percent of the earth surface is covered by the sea. With regard to the total volume only 5 % is known to mankind. Therefore, the development of marine systems is going ahead. The requirements are very high as applications are needed for water depths down to 6000 m. Extreme application conditions require special and reliable solutions. Submarine cables often have to fulfil very high demands regarding to mechanical and electrical stress. With our cable series for marine technology we offer sea water resistant hybrid and submarine cables as well as reliable data cables for the use in submarine robotics (ROV). SAB is your competent partner for the development and production of cables for tailor-made application solutions.

**We are your partner
for the varied challenges
of deep sea applications.**

- + depth resistance down to 6.000 meters
- + floatability
- + winch suitability
- + seawater resistance
- + abrasion and tensile strength
- + buoyancy neutrality
- + on request also available as cable harness



Your haven't found your special cable?

- Please contact our specialists:
We design and produce special cables according to your individual requirements!

How you can reach us: info@sab-cable.com

Phone support **+49 (0) 2162 898-0**



Cables for marine technology

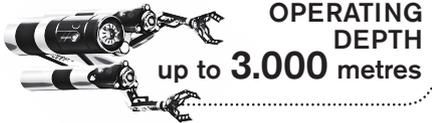


Li2YC11Y

Data cable with PUR outer sheath and overall copper screen for deep-sea use



Construction:	
Conductor:	bare copper strands, fine wires
Insulation:	PE
Colour code:	white, red, green, orange, blue, white-black, black
Stranding:	in layers, PE sheathed aramid strain relief as core
Wrapping:	non-woven tape
Screen:	tinned copper braiding, optical coverage approx. 85%
Wrapping:	non-woven tape
Sheath material:	PUR, low adhesion
Sheath colour:	black (RAL 9005)
Marking:	SAB BRÖCKSKES · D-VIERSEN · Li2YC11Y 7x0,50 mm ² and current meter marking



no. of cores x cross section n x mm ²	largest single wire ø mm	outer-ø ± 5% mm	copper figure kg/km	cable weight in salt water ≈ kg/km	cable weight in air ≈ kg/km	ohmic resistance at 20 °C max. Ω/km
7 x 0,50	0,18	10,0	59,5	44	124	39,0

Other dimensions and colours are possible on request.

Technical data:

Peak operating voltage	Testing voltage	Temperature range	Min. bending radius	Insulation resistance
750 V	core/core: 3000 V core/screen: 3000 V	fixed laying: -40/+70 °C flexible application: -40/+70 °C	fixed laying: 70 mm flexible application: 100 mm	core/core: ≥ 10000 MΩ x 1000 m core/screen: ≥ 100 MΩ x 100 m
Halogen-free	Oil resistance	Chemical resistance	Resistances	Min. tensile strength of aramid strain relief
acc. to IEC 60754-1 + VDE 0482-754-1	very good - PUR, TPU acc. to EN 50363-10-2 + DIN VDE 0207-363-10-2	good against acids, alkalines, solvents, hydraulic liquids etc.	good resistance against UV rays, ozone and vapours as well as resistant to fresh and salt water	3600 N

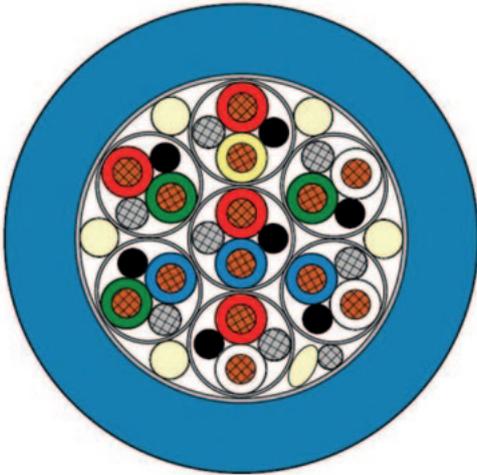
Absence of harmful substances
acc. to RoHS directive of the European Union

- + high tensile strength
- + high tear strength
- + high abrasion resistance
- + high notch resistance
- + high shear strength

Cables for marine technology

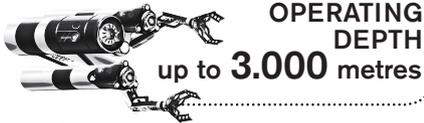
Special cable

Data cable with PUR outer sheath and foil-shielded data pairs for deep-sea use



Construction:

Conductor:	bare copper strands, fine wires
Insulation:	SABIX®
Colour code:	red/blue, red/yellow, red/green, green/blue, white/red, white/blue, white/green
Stranding:	cores twisted to pairs, pairs twisted in layers
Wrapping:	foil
Sheath material:	PUR with smooth surface
Sheath colour:	sky blue (RAL 5015)
Marking:	SAB BRÖCKSKES · D-VIERSEN · Special Cable 7x(2x0,50mm ²)ST and current meter marking



no. of cores x cross section n x mm ²	largest single wire ø mm	outer-ø ± 5% mm	copper figure kg/km	cable weight in salt water ≈ kg/km	cable weight in air ≈ kg/km	ohmic resistance at 20 °C max. Ω/km
7 x (2 x 0,50)	0,18	12,7	105,6	79	209	39,0

Other dimensions and colours are possible on request.

Technical data:

Peak operating voltage	Testing voltage	Temperature range	Min. bending radius	Impedance
max. 600 V	core/core: 2500 V core/screen: 2500 V	fixed laying: -50/+90 °C flexible application: -40/+90 °C	fixed laying: 120 mm flexible application: 150 mm	1 MHz 4,6 dB/100 m 4 MHz 8,5 dB/100 m 10 MHz 12,6 dB/100 m

Halogen-free	Oil resistance	Chemical resistance	Impedanz	Capacity
acc. to IEC 60754-1 + VDE 0482-754-1	very good - PUR, TMPU acc. to EN 50363-10-2 + DIN VDE 0207-363-10-2	good against acids, alkalines, solvents, hydraulic liquids etc.	1-10 MHz, 50,4-59,6 Ω	97-107 pF/m

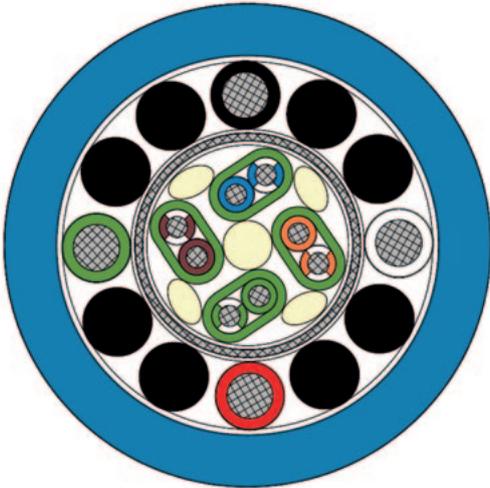
Resistances	Absence of harmful substances
good resistance against UV rays, ozone and vapours as well as resistant to fresh and salt water	acc. to RoHS directive of the European Union

- ⊕ high tensile strength
- ⊕ high tear strength
- ⊕ high abrasion resistance
- ⊕ high notch resistance
- ⊕ high shear strength



Special CATLine CAT6

flexible, halogen-free Ethernet cable



OPERATING DEPTH
up to **6.000 metres**

Construction:

Conductor:	24 AWG: silver-plated copper strands, fine wires 18 AWG: tinned copper strands, fine wires
Insulation:	FEP
Colour code:	24 AWG: blue-white/blue, orange-white/orange, green-white/green, brown-white/brown 18 AWG: black, white, red, green
Stranding:	24 AWG: pairwise
Inner sheath:	SABIX®
Stranding:	24 AWG: sheathed pairs stranded in a specially adjusted layer, wrapped with alu/PETP foil
Screen:	24 AWG: tinned copper braiding, optical coverage approx. 85%
Stranding:	core: (4x2x24AWG)Cat.6 wrapped with PETP foil. Outer layer: cores 18 AWG wrapped with non-woven tape
Sheath material:	PUR
Sheath colour:	sky blue (RAL 5015)
Marking:	SAB BRÖCKSKES · D-VIERSEN · Special CATLine Cat.6 (4x2x24AWG)Cat.6 + 4x18AWG <SAB Article no.> CE <SAB ID no.>

Abmessung mm ²	outer-ø approx. mm	copper figure kg/km	cable weight in salt water ≈ kg/km	cable weight in air ≈ kg/km	ohmic resistance at 20 °C max. Ω/km
(4x2xAWG24) Cat.6 + 4xAWG18	14,0	82,8	76	235	AWG24: 85 AWG18: 21

Other dimensions and colours are possible on request.

Technical data:

Operating voltage	Testing voltage	Temperature range
AWG18: 600 V AWG24: 250 V	AWG24 AWG18 core/core: 1500 V 2500 V core/screen: 1200 V 2500 V	fixed laying: -50°C/+90°C flexible application: -40°C/+90°C

Min. bending radius	Chemical resistance	Absence of harmful substances
fixed laying: 130 mm flexible application: 130 mm	good against acids, alkalines, solvents, hydraulic liquids etc.	acc. to RoHS directive of the European Union

Application	REACH	Data transmission
suitable for EtherCAT and EtherNET/IP applications	The product does not contain any SVHC (Substance of Very High Concern) acc. to REACH Regulation (EC no. 1907/2006)	Characteristic impedance 100 Ω ± 15 Ω. The element (4x2x26AWG) fulfils the transmission requirements with reference to EN 50288-5-2 (Cat.6 acc. to EN 50173)

- + high tensile strength
- + high tear strength
- + high abrasion resistance
- + high notch resistance
- + high shear strength
- + very good oil resistance
- + good resistance against UV rays, ozone and vapours and resistant to water



Cables for marine technology

Hybrid cable

with special polymer insulation and overall aramid screen as strain relief



OPERATING DEPTH
up to **300 metres**

Construction:

Conductor:	bare copper strands, fine wires
Insulation:	special polymer
Colour code:	AWG 26: blue-white/blue, orange-white/orange, green-white/green, brown-white/brown 1,0 mm ² : black cores with consecutive numbers 1-4, Ø 2,3 mm
Stranding:	cores AWG 26: pairwise and pairs together optimized twisted, PP foils with overlap wrapping
Screen:	(4x2xAWG 26): alu foil and tinned copper braiding, optical coverage ≥ 85 %
Stranding:	all elements twisted together optimized, swelling yarn in the fillers, non-woven tape with overlap wrapping
Screen:	tinned copper braiding, optical coverage ≥ 85 %
Inner sheath:	PUR, ultramarine blue (RAL 5002)
Strain relief element:	aramid braiding
Sheath material:	PUR
Sheath colour:	ultramarine blue (RAL 5002)
Marking:	acc. to customers requirements

Abmessung mm ²	outer-ø approx. mm	copper figure kg/km	cable weight in salt water ≈ kg/km	cable weight in air ≈ kg/km	ohmic resistance at 20 °C max. Ω/km
(4x2xAWG26) Cat.6 + 4x1,0	16,0	129,1	70	261	AWG26: 121,9 1,0 mm ² : 19,5

Technical data:

Other dimensions and colours are possible on request.

Peak operating voltage	Nominal voltage	Testing voltage	Temperature range	Min. bending radius	Halogen-free	Insulation resistance
max. 90 V	Uo/U 0,6/1kV	core/core: 1000V, 1 min core/screen: 1000V, 1 min core/core: 4000V, 10 min core/screen: 4000V, 10 min	fixed laying: -20°C/+80°C flexible application: -20°C/+80°C	fixed laying: 5 x d flexible application: 10 x d	acc. to IEC 60754-1 + VDE 0482-754-1	≥ 5 GΩ x km

Chemical resistance

good against acids, alkalines, solvents, hydraulic liquids etc.

Strain relief element

Min. tensile strength: 20 kN*
*Size can't be controlled by the manufacturer.
Testing is the responsibility of the user

Data transmission

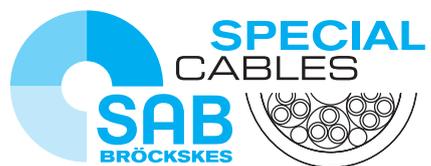
Element (4x2xAWG 26)Cat.6:
Characteristic impedance 100 Ω ± 10 Ω, fulfils the electrical and transmission requirements with high frequency with reference to EN 50288-5-2
Operating capacity is tested after first production
Attenuation values are tested after first production

- + high tensile strength
- + high tear strength
- + high abrasion resistance
- + high notch resistance
- + high shear strength
- + good seawater resistance
- + good UV resistance
- + good oil resistance

Absence of harmful substances

acc. to RoHS directive of the European Union





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